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EXTRACT

FROM THE

REPORT OF THE CHIEF ENGINEER

TO

THE SECRETARY OF WAR,

ON THE SUBJECT OF RAISING

A COMPANY OF SAPPERS, MINERS, AND PONTONIER.

OCTOBER 31, 1845.

**WASHINGTON:
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GENERAL

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EXTRACT FROM THE REPORT OF THE CHIEF ENGINEER.

ENGINEER DEPARTMENT,

Washington, October 31, 1845.

SIR: Having, in the body of my annual report, (herewith,) but slightly touched on the importance of organizing by law a body of engineer soldiers, or sappers, miners, and pontoniers, I now take leave to lay before you the following more extended remarks on that subject.

The necessity of organizing a body of engineer troops, and instructing them in the multifarious duties appertaining to the sapper, miner, and pontonier, has frequently and most earnestly been represented by this department; and the great importance of having the aid of such troops in nearly all the operations of an army, as well as the many valuable services which they would render to the country in times of peace, being understood, the proposition has, in every instance, received the favor and sanction of the successive heads of the War Department, and by them been urgently recommended to the favorable consideration of Congress. Several military committees in both houses have reported favorably upon the subject; none have reported adversely; and it has twice received the sanction of the Senate. So far as I have heard the opinion of the army, there are none who do not accede to the immediate necessity of the organization; and I know that officers of the highest authority and rank are warm friends of the proposition. The last two boards of visitors at the Military Academy, composed wholly of officers of rank and experience in the army, have insisted on the importance of connecting such a body with the practical military instruction of that institution. Greatly encouraged by this concurrence of sentiment and opinion, and relying confidently, as I do, upon your favorable consideration of the views I am about to present, I cannot but hope the organization of the proposed company will be authorized at the approaching session. That necessity which obliges us to keep alive the art of war by careful cultivation during peace, exists in a peculiar manner as to this kind of force; because its duties demand not only much training, but training not to be had either in the rest of the military profession, or in any of the arts of civil life, there being in neither any analogous pursuits or labors. The art can be taught only in a special school. If, then, we have in our political relations or positions any prudential reasons for a due preparation of military elements, this is one which should be among the first provided, being one requiring most time to bring to perfection. It is from a very strong conviction of this truth and its importance that I may venture to the verge, possibly, of importunity, in my desire to enlist your active support, knowing that success cannot be hoped without it.

Engineer troops form a part of all modern armies, both on the peace and war establishments, and are so instructed and disciplined in times of peace as to qualify them for the skilful execution of the various labors of sapping, mining, and bridge building, and for many other half mechanical operations, which are continually, during a campaign, a siege, or a defence, calling for prompt and skilful performance. And the organization which

incorporates these troops into all existing armies is the growth of nothing else than the experience and necessities of actual warfare.

Profiting, in some degree, by the dear bought experience of older nations, we have adopted many of the good features of their military organizations. Our infantry regiments are organized, trained, and disciplined according to the French system. The same remarks are applicable to our dragoon service. Only a few years ago, some two or three cavalry officers were sent to France, with a view to study the sword exercises, the equipment of horses, stable duty, horsemanship, drill, manœuvres, and all that appertains to this branch of service. This resulted in the acquisition of much useful information, and the introduction of changes which no doubt added materially to the efficiency of our dragoon regiments.

A similar course was pursued for the improvement of our system of artillery. Three officers of the Ordnance corps were sent to Europe for the purpose of examining the various improvements made in the science of gunnery, the manufacture of cannon, of gun-carriages, of ammunition, and artillery implements. These officers made extensive examinations, and have profited the country greatly by their observations. It appears, therefore, that on these branches namely—artillery, infantry, and cavalry, much assistance has been supplied by the experience of older nations; and that well-trying improvements have been wisely, and as promptly as they became known, naturalized in our military service.

After profiting to this extent by the experience of warlike nations, if we look further into their military organizations we find that they all have a greater or less number of engineer troops; that these troops are considered absolutely essential to the efficiency of the armies; that they are necessary at all times, whether on the march, in the field of battle, besieging a place, or defending a fortress; and, especially, that they are formed in times of peace, and then carefully instructed and profitably employed in all their various and difficult duties. Is it not prudent to profit by these lessons also? Can we safely delay doing so till it will be too late to give these troops the skill on which *their* value depends?

The engineers of our army consist of a small body of officers, forty-five in number, corresponding to the "*Engineer Staff*," as this arm is organized in other services. For the want of engineer troops, it is next to impossible for these officers to acquire any practical knowledge of many difficult operations which they are required to execute, either in the defence of our forts; in the attack of permanent works; in building ponton or other temporary bridges; in the destruction of bridges; in throwing up field works; or in many other equally difficult operations, which they are expected to understand, and which they should understand *practically* as well as theoretically, if our army is to receive the assistance so often indispensable to its efficiency. But if engineer officers were themselves in possession of this practical knowledge, they would still be helpless, or nearly so, without having at command persons competent to execute their instructions. They need military artificers (so to call them) to execute the various works required in campaign, not less than in peace they need mechanics to labor upon permanent fortifications. A mere theoretical mariner would manage a ship in a storm but badly; but how perilous indeed would be his situation were the crew also all landsmen.

But it may be well to refer to a few of the many lessons which history teaches us, and show, by the experience of others, the dangers to which we are exposed.

Before adducing instances in illustration of the delays and disasters attending the operations of armies not supplied with engineer troops, and, on the other hand, the advantages resulting from their services when properly organised and instructed, I beg leave to quote a few of the recommendations and views of some of the most able officers and commanders of modern times. As early as 1679, under the reign of Louis XIV, we find Vunban, the most skilful engineer the world has ever produced, recommending officially to his sovereign the organization of a regiment of sappers and artificers, (*ouvriers*). And in a subsequent memoir, when urging upon the French government the advantages of employing engineer troops, he writes, "they would be useful in peace as well as in war, and would be the means of saving much in all fortifications, where they should be employed. In fact, I have not the least doubt that they would save annually to the king much more than their pay. I assert all I have said on this subject with as much confidence as if I had seen the results; and I can with the same certainty add, that this small troop will be the means of saving large numbers of good engineers and brave officers and soldiers from the stern necessity to which we are reduced, of exposing, almost always, the laborers and those who support them, which necessity would not arise had we at command a sufficient number of this kind of workmen well instructed. To such a degree have I felt the necessity of sappers at every seige at which I have been present, that I have always had to repent of not having more urgently solicited the creation of this company."

The Duke of Wellington, when commanding in the Peninsula, frequently urged upon his government the organization of a corps of sappers and miners. His strong representations, and the great necessity then so apparent, induced the nation to establish on a better footing the present English corps of engineer troops. In a letter of February 11th, 1812, he writes to the Secretary of State in the following words: "I would beg leave to suggest to your lordship the expediency of adding to the engineer establishment a corps of sappers and miners. It is inconceivable with what disadvantage we undertake any thing like a seige, for want of assistance of this description. There is no French corps d'armie which has not a battalion of sappers and a company of miners; but *we* are obliged to depend for assistance of this description upon the regiments of the line; and although the men are brave and willing, they want the knowledge and training which are necessary. Many casualties among them consequently occur, and much valuable time is lost at the most critical period of the siege."

The above opinions have been selected because they come from generals at the same time pre-eminent for ability and remarkable for the extent of their experience. It must not be supposed that the necessities which are the ground of these opinions belong solely to a warfare carried on amidst walled towns and fortified places; such a supposition would imply, incorrectly, that the difficulties and obstacles attending all operations of a campaign, except sieges and the like, can be removed or overcome by the weapons or ordinary outfit of the soldiery. We have, happily, as regards a country then in a state of almost primitive nakedness, the very highest authority of our own on this point. In a private "order book" belonging to General Washington, I have seen an order, in his own hand-writing, dated 30th March, 1779, for the creation and government of a body of sappers and miners. It provides as follows: that "until men are enlisted for the purpose, companies of sappers and miners, not exceeding three, shall be formed as cir-

cumstances may require, by draughts from the line, at the discretion of the commander-in-chief; and be under the command of the commandant of the corps of engineers, until otherwise ordered by Congress."

"The duty of the companies of sappers and miners shall be, under the direction of the engineers, to construct field works of every kind, and all works necessary for the attack or defence of places, as circumstances may require."

"On a march in the vicinity of an enemy, a detachment of the companies of sappers and miners shall be stationed at the head of the column, directly after the vanguard, for the purpose of opening and mending the roads, and removing obstructions." The order is a long one of 16 or 17 paragraphs—the above quotations being only a small portion; enough, however, to show some of the duties of sappers and miners as then understood, and the need, then clearly appreciated, of setting apart a special body for their execution. As therein defined, these duties obviously demand previous training for their skilful execution; and still more will this training be necessary, if, as now designed, the functions of pontoniers be added.

The remarks quoted above from the Duke of Wellington relate more particularly to the assistance which a body of workmen properly trained and instructed can give in conducting the operations of a siege; but the same campaigns which he was then conducting are replete with instances in which the English army was subjected to delays, disappointments, and defeats, for the want of men skilled in the construction of bridges, the erection of batteries and temporary defences, and in the various works necessary to the defence of camps and fortified places. If a stream chanced to flow between the French forces and the English, the former could prosecute their operations in defiance of their enemies, because to the latter the stream was an insurmountable obstacle, and their approach was rendered impossible for the want of skilful men, and the proper appliances. To show more clearly how important it is for a general to possess the means of crossing rivers, I will quote the following language from Napoleon. He speaks of his passage of the Po, at Placentia: "I felt the importance of hastening the enterprise, in order not to allow the enemy time to prevent it; but the Po, which is a river as wide and deep as the Rhine, is a barrier difficult to overcome. We had no means of constructing a bridge, and were obliged to content ourselves with the means of embarkation found at Placentia, and in its environs. Lannes, chief of brigade, crossed in the first boats, with the advanced guard. The Austrians had only ten squadrons on the other side, and these were easily overcome. The passage was now continued without interruption, but very slowly. If I had had a good *ponton equipage*, the fate of the enemy's army had been sealed: but the necessity of passing the river by successive embarkations saved it." In the winter of 1813 and 1814, when Napoleon was engaged in his German campaigns, he writes to his minister of war: "If I had had *ten pontons* I should have already annihilated the army of Swartzenberg, and closed the war; I should have taken from him eight or ten thousand wagons, and his entire army in detail; but for the want of the proper means I could not pass the Seine." Subsequently, on the 2d of March, he wrote, "If I had had a bridge equipage this morning, Blucher's army had been lost."

During the earlier campaigns on the Peninsula, the British army sustained many losses resulting from deficiencies in the engineer troops. In the retreat of Sir John Moore from Spain, in 1808, many valuable and brave soldiers were lost from this cause; and in almost every instance where the

commander-in-chief directed the bridges to be destroyed, with a view to retard the pursuit of the French, the engineers failed to accomplish their destruction, simply for the want of the necessary miners and miner's tools. In the month of March, 1811, the French forces captured Badajos, and on the 25th of the same month the English army, under Sir W. Beresford, reached the banks of the Guadiana, opposite that city. The works of the recent siege still afforded considerable shelter for a besieging army; the breach remained open, and the garrison had but an ill supply of provisions, ammunition, and stores. The recapture of the place was not only inevitable, but a matter of easy accomplishment, if speedily invested. Unfortunately for the English army, it was not supplied with a ponton train, or any other means for crossing rivers. A fortnight was consumed in the construction of bridges, which gave the French ample time to fill up the trenches, partially rebuild the breach, throw in a quantity of supplies and ammunition, and to secure their battering train. This proved sufficient to render the siege a hopeless undertaking. The historian, observing upon this failure, remarks, that it resulted in a "delay, that may be considered as the principal cause of those long and bloody operations which afterwards detained Lord Wellington more than a year on the frontiers of Portugal." The siege of Badajos, which was undertaken soon afterwards, failed entirely, and historians agree in the opinion that the failure was not attributable to a want of courage or devotion on the part of either officers or soldiers of the English army, but was the natural result of a lamentable deficiency of men properly instructed, and of inadequate supplies of the material essential to the successful prosecution of like operations. Col. J. T. Jones, in detailing the operations of this siege, says: "A body of sappers and miners, and the necessary fascines and gabions, would have rendered the reduction of the work certain. Soon after this siege a body of engineer troops arrived from England, but their number was insufficient; and Wellington, having learned by sad experience the importance of engineer troops, ordered a body of two hundred volunteers to be detached from the line, and daily instructed in the practice of sapping, making and laying fascines and gabions, and the construction of batteries, &c." The English operations were afterwards crowned with greater success.

In addition to the necessity for engineer troops in defending forts, conducting sieges, building bridges, and opening roads, they are absolutely essential to the expeditious and proper construction of field works required for the protection of the positions and movements of all armies. In every campaign these temporary works must be erected, and a few instances in which they have been employed to great advantage may be named—as the lines of Torres Vedras, the works of Ronda, the intrenchments of Milsims; and in improving, just before the battle of Waterloo, the defences of the frontier of the Netherlands, on which, for some months together, 18,000 peasants and 2,000 horses worked by order of the Duke of Wellington, under the direction of British officers of engineers.

Colonel Pasley, when speaking of these defences, says: "Now, it may be easily conceived that, to have directed such a great body of workmen to proper advantage, by means of a few officers of engineers, would have been impossible but for the system adopted of subdividing the various works amongst the non-commissioned officers and privates of the engineer troops, each of whom was made responsible for laying out the details of his own portion, and for the direction of a party of from 20 to 100 men, or even more, according to circumstances."

Limited as is the military experience of our own country, its history teaches some lessons which it may be useful for us to study. Of these I will cite but one: In the fall of 1776 General Washington made his memorable retreat across the State of New Jersey, closely pursued by the English forces. By great good fortune Washington was able to cross the Delaware river; and by extraordinary efforts he succeeded in securing all the boats employed in the passage, and thus deprived the enemy of their use. "Intelligence had been received," says Marshall, "stating the enemy to have brought boats with them. Should this be the fact, the river was so completely passable as to render it impracticable, without a force greatly exceeding that possessed by the American general, to prevent their crossing it." Fortunately for the army, and for the safety of the city of Philadelphia, such was not the case; the English general was unprovided with a ponton equipage, or other means of crossing rivers, and thereby lost the opportunity of striking a blow, of which the effects must have been very disastrous to the cause of independence.

History furnishes many other examples of a similar character, demonstrating unequivocally that failures and defeats most surely attend every campaign undertaken by an army not provided with the necessary machinery and appliances of war, and deprived of the services of men skilled in their use by a previous course of discipline and instruction. Very many instances of this nature might be presented, but it is deemed unnecessary to dwell longer upon the experience of the past.

Coming to the present, what do we find to be the state of preparation in these particulars in France, England, and the United States? The following facts will answer:

In 1841 (and it is believed to be the same now) there were in the French service $3\frac{1}{2}$ regiments, divided into 7 battalions and 66 companies of sappers, miners, and pontoniers, constituting, in time of peace, a force of upwards of 6,000 men; and on the war establishment a force of about 9,600 men. The regiments of sappers and miners were stationed at Metz, Arras, and Montpellier; and at each of these towns there are engineer schools for the instruction of the non-commissioned officers and privates in the theory and practice of their art. They are exercised as infantry, as well as sappers and miners; the time between the 15th of March and the 1st of May being devoted to infantry drill, and from the 1st of May to the 1st of November they are exercised in practical engineering. During the remainder of the year they are occupied with their studies and indoor exercises. While engaged in the course of practical engineering, they are taught to fabricate all the material required for carrying on the operations of a siege, such as fascines, gabions, &c., and to construct the parallels, trenches, and batteries of a regular approach. They are also instructed as to the defence of a work, executing practically all the operations appertaining thereto; and they are, moreover, practised in carrying on their labors at night. In addition to these three regiments, there are a battalion of pontoniers and a company of artificers (*ouvriers*.) The former are taught the construction and use of ponton bridges, and the latter are employed as workmen in the shops of the engineer arsenal, where they make all the tools used by the engineers in the attack and defence of forts, in the construction of field works, bridges, roads, and in all the other labors devolving upon that arm. The pontoniers are frequently exercised in establishing ponton bridges across rivers; and their training is so perfect, that the whole operation of

placing a bridge is executed by them over a river with a current of six miles per hour, with as much order, precision, and certainty, as if the water were motionless.

In the English army there are now similar troops, well instructed in sapping, mining, and bridge building. These soldiers are all united in one corps under the name of royal engineers; and a school has been established at Chatham for the practical instruction of the officers and men in their various appropriate duties for peace and war. General Pasley, the officer charged with the direction of this school, says: "The officers of the corps of royal engineers (British army) had no means of preparing themselves for their arduous and important duties in the field previously to 1812. Since that period the junior officers of the royal engineers, and all the non-commissioned officers and soldiers of the departments, in addition to the studies requisite for their respective stations, have been diligently exercised, not only in the execution of parallels, approaches, batteries, saps, mines, and other works of a siege, but also in the manœuvres of pontons, and in the formation of military bridges in general; so that there is no operation which the British engineer department can be called upon to perform in the face of an enemy for which the officers and men may not with propriety be said to have been previously qualified by actual experience; and the kind of experience which is thus acquired at home is peculiarly necessary for a corps whose duties are not only of the most vital importance towards the success of armies, but which, in a war of sieges, (such as every obstinately protracted contest must necessarily lead to,) are of so very hazardous a nature, that, in the common course of military events, the major part of the officers are always likely to be killed or disabled before they can possibly have opportunities of acquiring an equal degree of practical knowledge in the field."

Saying nothing of other European armies, in each of which there is a body of engineer troops, I turn to our own army to find a serious deficiency in the organization of the engineer service. The deficiency is not in the theoretical instruction of the officers, nor in the practice of duties pertaining to the erection and repair of our system of frontier and coast fortifications. In these, their opportunities and means are sufficient, and if there be defect the fault is entirely their own. But it is that the officers (forty-five in number of our small corps) are without a single non-commissioned officer or soldier, or, as before stated, any means of acquiring themselves, or instructing others who are to be their assistants, in a practical knowledge of many of the important duties that are to devolve on them in the field. The consequences that may flow from this state of things, may be inferred from the disappointments, disasters, and defeats to which, as we have seen, other nations, likewise deficient in engineer organization, though much better provided than ourselves, have been subjected.

At this moment we have an army of "observation" in the field, liable to be attacked by the troops of a neighboring power, and entirely unprovided with pontoniers, ponton equipage, or any other means of crossing the many streams which intersect all the lines upon which it must operate in case of hostilities. The general in command of this army is fully aware of its deficiency in this respect, and has, as is shown by the following extract from his letter to the Adjutant General, made application for a supply of pontons and ponton wagons.

Extract from a letter of Brevet Brigadier General Z. Taylor, United States army, to the Adjutant General of the army, dated August 26, 1845.

“A moderate supply of pontoons and ponton wagons might greatly facilitate any active operations in this country, where it is next to impossible to bridge the streams, owing to the scarcity of timber.”

Since the date of the above communication to the Adjutant General, an application has been made to the War Department by General Taylor for a supply of pontoons and a ponton train, for the use of the army under his command. This call is now made upon the government; and the equipage applied for is indispensable in a country of prairies, where wood cannot be found for building bridges.

The important services which the proposed body of sappers, miners, and pontoniers would perform in time of war, have been made apparent by the preceding facts and observations; but these troops will also be usefully employed in time of peace, and, by a proper direction of their labors, will save annually to the government a sum at least equal to the expense of maintaining them. As to the manner of employing them, and the services they can render the country in time of peace, I shall repeat from my former reports and communications on this subject. One of the first employments of the proposed troops will be at the Military Academy, giving the aid necessary to the establishment of a course of practical field engineering at that institution. Other branches of practical military instruction can be, and are, acquired in garrisons and in camp, even in time of peace, but neither field nor garrison service at such a time affords any example of the exercises in question; they belong exclusively to war, except as a portion of them are occasionally necessary within the technical limits of the engineer officers' duties, and they can be generally taught, therefore, only at a special school.

During the season of encampment at the Military Academy, the sappers, miners, and pontoniers would be carrying on a course of practical field engineering, in company with the graduating class of cadets, and under the direction of the officer of engineers commanding the sappers, aided by all the officers of engineers who are stationed at the institution to assist in its instruction. By these means this most useful description of knowledge will be diffused through every corps of the army; and officers of engineers, whose special duty it is to take charge of such operations, will be relieved from the necessity of taking the field without ever having seen constructed a gabion, fascine, or any other of the various and peculiar materials of their art.

The instruction communicated to the sapper, miner, and pontonier at the Military Academy would, moreover, render them invaluable as assistants to engineer officers carrying on civil or military works. If every officer in charge of a work in progress were provided (according to the size of the work) with one or more of the men thus instructed, to act as overseers, the advantage to the public service, and the economy, also, would be great. As it is, these officers are obliged to employ people who, however expert as mechanics, know nothing of the peculiar structures they are about to superintend, and are, moreover, almost always contaminated by the contract system of building now generally applied to private edifices. The high qualifications as to character and professional skill—not always to be secured, however, at any price—which should accompany the responsible trusts confided to these hired persons, demand, of course, the payment

of high wages, because the fidelity and skill necessary to maintain a steady diligence in a large body of laborers, and the accurate execution of expensive and complicated workmanship, can be found only among persons who command the highest wages in the business of private life. Had the engineer officer no other duty than to overlook his workmen, he still could be in one place only at one time, all other places being unavoidably left to subordinate supervision; so that great loss and injury must accrue from any unfaithfulness or ignorance in these subordinates. Substitutes can be obtained for these subordinate agents by making draughts upon the proposed engineer soldiers; and to show the advantages which would result by this substitution in point of economy, in addition to the greater efficiency, I offer the following statement of the average rates paid to the agents now employed upon the fortifications in progress of construction:

Assistants receive an average pay of	-	-	-	\$3 33 $\frac{1}{3}$	per day.
Master workmen do	-	-	-	2 55	do
Overseers do	-	-	-	2 50	do
Sub-overseers do	-	-	-	1 75	do
Sub overseers, lowest grade, do	-	-	-	1 50	do
Fort-keepers do	-	-	-	13 00	per month.

Now, the least number of engineer troops which will give anything like an official organization, is a company composed of not less than 100 men, namely: ten sergeants or master workmen; ten corporals or overseers; two musicians; thirty-nine privates of the first class, or artificers, and thirty-nine privates of the second class, or laborers. "The duties which it is designed to impose on these engineer soldiers require men possessing superior physical qualities, intelligence, a certain degree of education, and also some trade or handicraft that can be applied to the peculiar functions of the company. It will be in vain to look for favorable results with qualifications of a lower order; and those we ask for are not to be commanded without paying for them. The experience of the Ordnance Department shows the prices at which analogous employments may be filled; and these have been adopted in estimating the annual cost of an engineer company of one hundred men, except as to the pay of the non-commissioned officers, which has been made somewhat less than the pay of ordnance sergeants and corporals. The cost of the entire company, at the rates of pay taken, will be \$25,935 91 per annum.

"If, now, we suppose one half of the company to be distributed amongst the several constructing officers, they would stand, in lieu of the persons now employed, as follows: Five sergeants, in lieu of five assistants or principal overseers, at the rate of \$3 33 $\frac{1}{3}$ per day, or \$1,040 per annum, amount to

-	-	-	-	\$5,200
"Five corporals, in lieu of five overseers of the lower grade, at the rate of \$2 50 per day, or \$780 per annum, amount to	-	-	-	3,900
"Twenty privates of the first class, in lieu of twenty sub overseers, at the rate of \$1 75 per day, or \$506 per annum, amount to	-	-	-	10,920
"Twenty privates of the second class, in lieu of twenty sub-overseers of the lowest grade, at the rate of \$1 50 per day, or \$468 per annum, amount to	-	-	-	9,360

\$29,380

The sum of \$29,380, is the amount paid every year to fifty persons, whom the constructing officers would most gladly see replaced by the same numbers from a well-instructed engineer company, while the total cost per annum of the *whole* company of one hundred men will be, as above stated, but \$25,935 91. There will still remain fifty more to do service at West Point, and for other purposes.

These troops will also furnish the means for "supplying to each of the finished forts, according to its size, one, two, or more engineer soldiers, whose special duty it will be to make repairs, as they may be needed, on parts of the fortifications not likely to be otherwise attended to. They are designed to have a relation to the forts—of course under the direction of the commanding officer—analogous to that which ordnance sergeants have to the armament of forts. Through the instrumentality of these soldiers, the forts may be kept from falling into that gradual deterioration which leads inevitably, if not checked, to serious expenditures every few years. Even works of the most permanent nature are obliged to expose to an enemy's fire slopes of earth, and these require constant and skilful nursing. The best masonry needs occasionally, in our variable climate, repairs here and there to the pointing of the walls and copings. A leak in a casemate, which might be stopped in a few hours, will, if neglected, fill all the surrounding walls and piers with water, causing barracks, store-rooms, or magazines to become worse than useless, and exacting heavy expenditures for repairs. It is not possible to turn into dollars the saving that will follow the arrangement proposed ; but, it cannot be doubted by those familiar with the frequent necessity for slight jobs of the kind mentioned, and the rapid spread and serious consequences of injuries not at once corrected, that the saving within a few years, even in money, will be great ; though the result, in its bearings upon the efficiency of the works, would be still more important. Every inspection that I make of occupied forts satisfies me more and more that, as regards the maintenance of a fit and durable state of efficiency, and, as regards security against the recurrence of frequent heavy repairs, there is need of other aid than that which an ordinary garrison will supply. The general duties of police ; the maintenance of order and neatness ; the state of aptness and readiness to make the most of the military means in their hands,—these, and all that discipline and gallantry can accomplish, may, no doubt, be looked for with certainty. But there are several other matters, apparently very small, perhaps, which are more strictly technical as regards fortifications, and which, though indispensable, are very likely to be overlooked, or are not likely to be attended to with the care they demand, unless some provision, of the nature recommended, be made ; and I think none so good and so cheap as that proposed can be found."

By employing a part of the engineer soldiers, in time of peace, as assistants and overseers in the construction of our seacoast and frontier forts, and as fort-keepers when these are finished, they will become familiar with the general design and object of these fortifications, and with the details of construction and arrangement of the several parts, so as to be qualified to aid in those labors within and about a fort which are necessary to meet and counteract the efforts of an assaulting or besieging foe. If the absence of regular troops should, in any case, throw upon the militia the duty of supplying garrisons for the forts upon the seacoast, the presence therein of a few engineer soldiers thus instructed might

be of the greatest consequence. The presence of such persons, and of ordnance soldiers in charge of the armament and magazines, would leave to the militia garrisons only duties very simple in their nature, and soon learned by men who have anticipated, by their sports in early life, the most difficult acquisition—namely, that of aiming with precision. Being relieved by the engineer and ordnance soldiers from the important technical duties of the post, and having to learn only the management of the single gun, unattended by any marchings or manœuvres, the militiaman would soon acquire a confidence that would keep him manfully to the walls, and enable him to apply with full effect his characteristic skill as a marksman. Touching this particular application of the engineer troops—one destined to have a very important bearing on the defence of our extensive frontier, especially on the seacoast—I might adduce cogent arguments, but, owing to the length of this letter, I abstain; as also from several other important points. And I now close by recapitulating the principal objects to be accomplished by the creation of a body of engineer troops.

I. To supply the army with a description of force indispensable to military operations in time of war, but which can be duly prepared only by careful and prolonged instruction and drilling in time of peace. They must possess the art and skill required to execute all operations in the defence of fortifications; in the attack of an enemy's works; in the erection of batteries, entrenchments, field-works, military obstructions, roads, and bridges; and in throwing over rivers ponton and other floating and flying bridges.

II. To supply engineer officers, in their constructions during peace, with overseers and master-workmen, to the great advantage of the public service and great saving of expense.

III. To supply to each fort, when finished, persons whose duty it will be to execute all current labors, keeping the works at all times in readiness for service, thereby avoiding extensive and costly repairs.

IV. To supply a small force, to be stationed at West Point, for the purpose of themselves receiving instruction, and giving the assistance necessary for teaching the cadets a course of practical military engineering.

You will notice that no additional officers are asked for, the proposition being restricted to raising a company of one hundred non-commissioned officers, musicians, and privates, to be officered from the present corps of engineers.

The whole expense of the company per annum will be, as before stated, \$25,935 91, as shown by the following particulars:

10 sergeants: pay, \$3,600; rations, \$684 37½; clothing \$319 30		\$4,603 67½
10 corporals: pay, \$1,920; rations, \$684 37½; clothing, \$307	2,911 37½	
2 musicians: pay, \$192; rations, \$136 87½; clothing, \$53 26	392 13½	
39 privates, 1st class: pay, \$6,084; rations, \$2,669 06¼; clothing, \$1,197 30	9,950 36¼	
39 privates, 2d class: pay, \$4,212; rations, \$2,669 06¼; clothing, \$1,197 30	8,078 36¼	
Total of pay, rations, and clothing		<u>\$25,935 91</u>

There will be required, for the equipment of the company with tools and implements as sappers and miners, a sum of \$600; which expense need not be renewed except at very long intervals, as the more expensive portions will last fifty years. There will also be needed, whenever the instruction in pontoniering shall commence, a further expenditure of \$3,000, to provide a small ponton train for use in the exercises of the school. This sum, being the total for pontoons, skiffs, wagons, &c., will not require renewal till after the lapse of many years. The auxilliary expenditures will amount, therefore, to \$3,600, in the first instance; but this is not an annual expense.

If we restrict our enlistments to persons of proper qualifications and character, which is indispensable to the objects in view, the company can be filled only slowly, and we cannot expect to require, for the first year, for pay and allowances, the sums that would be absorbed by a full company; an appropriation of \$25,000 for the fiscal year ending June 30, 1847, will therefore suffice for all purposes, and accordingly this sum is asked.

I annex a copy of a bill which embraces all necessary provisions. The same bill, excepting the appropriation clause, has twice received the sanction of the Senate.

And have the honor to be, very respectfully, your obedient servant,

JOS. G. TOTTEN,
Colonel, and Chief Engineer.

Hon. WM. L. MARCY,
Secretary of War.

A BILL for the organization of a company of sappers, miners, and pontoniers.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there be added to the corps of engineers one company of sappers, miners, and pontoniers, to be called engineer soldiers; which company shall be composed of ten sergeants or master workmen, ten corporals or overseers, two musicians, thirty-nine privates of the first class or artificers, and thirty-nine privates of the second class or laborers; in all one hundred men.

SEC. 2. *And be it further enacted,* That the pay and rations of the sergeants, or master workmen of said company, shall be the same as those now allowed by law to the master workmen employed by the Ordnance department, excepting that the engineer sergeants shall receive one ration only per day, instead of one ration and a half; of the corporals, or overseers, the same as those now allowed by law to the armorers, carriage makers, and blacksmiths employed by the Ordnance department, excepting that the engineer corporals shall receive one ration only per day, instead of one ration and a half; of the privates of the first class, or artificers, the same as those now allowed by law to the artificers employed by the Ordnance department; of the privates of the second class, or laborers, the same as those now allowed by law to the laborers employed by the Ordnance department; and of the musicians, the same as those allowed by law to the musicians of the line of the army: the said non-commissioned officers, privates, and musicians, being respectively entitled to the same clothing and other allowances as are granted by law to non-commissioned officers, privates, and musicians, of the artillery, in the army of the United States.

SEC. 3. *And be it further enacted,* That the said engineer company shall be subject to the rules and articles of war; shall be recruited in the same manner, and with the same limitation; and shall be entitled to the same provisions, allowances, and benefits, in every respect, as are allowed to the other troops constituting the present military peace establishment.

SEC. 4. *And be it further enacted,* That the said engineer company shall be attached to, and compose a part of, the corps of engineers, and be officered by officers of that corps, as at present organized. They shall be instructed in and perform all the duties of sappers, miners, and pontoniers, and shall aid in giving practical instruction in these branches at the Military Academy. They shall, moreover, under the orders of the chief engineer, be liable to serve, by detachments, in overseeing and aiding laborers upon fortifications or other works under the engineer department, and in supervising finished fortifications as fort-keepers, preventing injury and applying repairs.

SEC. 5. *And be it further enacted,* That the chief engineer, with the approbation of the Secretary of War, be authorized to regulate and determine the number, quality, form, dimensions, &c., of the necessary vehicles, pontons, tools, implements, arms, and other supplies, for the use and service of said company, as a body of sappers, miners, and pontoniers.

SEC. 6. *And be it further enacted,* That for the fiscal year ending June 30, 1847, the sum of twenty-five thousand dollars be, and the same is hereby, appropriated, to be paid out of any moneys in the treasury not otherwise appropriated, for the pay, subsistence, and clothing of said company, and for carrying out the other purposes of this act.

